Date: 04/22
PPL: Jaelyn, David, Dr. Axel Krieger

End-effector Update:
1. Having trouble with end-effector actuation using arduino
Dr. Krieger: utilize PWM signal to drive arduino
2/ Cam design need be temporarily postponed due to lack of power supply
Ok, but should consider separate prototype

3. Confirmation on test bed assembly
missing some components that are yet to arrive, should be here in a few days

Build of Ubuntu virtual machine that supports ROS;
GUI can be designed using QtCreator;
Refer to the tutorial of ROS

Date: 04/06
PPL: Jaelyn, David, Dr. Axel Krieger

Mechanical Design :

1. Off the Shelf Purchase:

a. 3D/ 2D Cartesian Robot (Z-direction Not necessarily needed, but since it is pre-assembled)Pro: Stable

Con: Maybe Overly complicated

Alternative choice: using Cartesian Robot from Dr.Krieger but raise it vertically.

End effector:

2. Dimensions:

Device Dimension: 320mm * 170 mm * 30 mm (Only considering in), How much slack should I leave?

End Effector:

1 . Off the shelf:

Purchase grabber + linear squeezer => CAD modify with hitting button
Button size: average 15 mm * 10 mm

2. Piston(CAM) vs Brush Mechanism （Solenoids）

Push type or retract, buy push and small springs. Known weight to measure solenoid force need

3. Logistics:

Screw Driver set, L-brackets connectors, Super Glue, Power Supply (Try using 5V 1A Arduino), Control Unit(Arduino, motor shields controller, DC motor controller), Wire Management, wire cutters, sottering.

Date: 04/05
PPL: Jaelyn, David,Balazs

Meeting with Balazs Vagvolgyi

1. Json Format
   Json validator
2. Computer Vision Strategy

3. Documentation of detail in Email from Balazs

User Interface: question about swift and x-code;

- Will change UI construction to Linux to better work with Russ;
- Swift is not a good platform for using openCV.

Change the name of the buttons into units?
The current design has 1 DOF which is not quite needed; will improve.
Note that 1DOF is different from 1 degree (in error analysis)
Force detector implemented via spring;
How would the robot orient relative to the oscilloscope (straight to the front)
We are planning to use ROS, does ROS work from swift (Resolved)
Store the configuration of the equipment so that we can avoid doing further recognition of various buttons.

Json file for configuration of the equipment.
Dependencies:
I have to run, sorry. My question would be if you have some camera feedback?

Recognize, Register, Select control

Does not need a cloned interface, working via Linux instead.

Date: 04/01
PPL: Jaelyn, David,Balazs

1. The size is compatible with the actual oscilloscope (checked);
2. Material: PLA.
3. How to mount on the base? Is the spring strong enough?
4. How is the motion actuated?

5. Only finger rotating is simpler;
6. Finger tip is too big; put one tip to one of the finger;
7. Touch build in the finger itself;

1. Not spring as support;
2. Linear guide, shaft, spring on the outside of the shaft;
3. Rotational DOF;
4. Linear bearing for horizontal movement; ? I missed that due to internet instability
5. T slot: up and down and no prevention for tilting; steel tubes, Teflon another internet instability;
6. Actuation;
7. Buy a 2D cartesian robot directly;
8. Simplify end effector;
9. GO in and out quickly;
10. McMaster-Carr

More features that can be used;

Camera
Hand eye calibration;

Date: 03/16
PPL: Jaelyn, David
Notes:

1. Preparation for Project Check Points
    a. Make powerpoints
    b. Summarize findings and results
2. Evaluate different design using Evaluation Chart
3. Continue 3D CAD design of End Effector
4. Disucussion of potential meeting time for in person testing
    a. 2nd week of april weekend?
    b. Covid test 7 days ahead
    c. Book a common work space for testing
5. To Do:
    a. Finish Current Work and Prepare For plan presentation

Date: 03/12
PPL: Jaelyn, David

Notes:

1. Ideation of different design for mechanical end effector based on Interaction type
2. Check the Design folder for drawing

3. Discussion of literature findings
    a. Mostly biobased ergonomics of end effector
    b. 2 prong dominants most task
4. To Do:
    a. CAD design

Date: 03/08
PPL: Jaelyn, David

Notes:

Ideation of Evaluation Chart

- Important: Focus on specific modulation of interaction
- Types of Interaction: Button, Screen, Knobs, slider (On the list of important / Frequency in Oscilloscope)
- Document Link:
    - https://livejohnshopkins.sharepoint.com/:x:/r/sites/RemoteICURobotProject-CIS2/_layouts/15/Doc.aspx?sourcedoc=%7BB4E2EFDF-FA7A-46CD-9C7B-6A5F076577FB%7D&file=Evaluation%20Chart.xlsx&action=default&mobileredirect=true

Discussion on User Interface Architecture:

1. What is more important, reflection of reality vs simulated simplicity
    a. Simulation
        i. Benefit: offers more possibility and replicate the experience just as well as camera live feed
        ii. Downside: more data capturing using CV algorithms, more chance to have error. More Work
    b. Live view:
        i. Benefit: Have live feed back , more reliable, feels more “accurate”
        ii. Downside: occupies large screen portion, might be influenced by angle of view.

To Do:

1. Continue reading literature
2. Think about specific designs that meet specific modality interaction requirements
3. Think about how interactive design can cooperate as much feature as possible
4. Continue learning User Interface

Date: 03/04
PPL: Jaelyn, David,Dr.Kriger, Balazs

Notes:

1. Question:
    a. Which platform should we base our GUI on?
        i. Dr.Kriger:
            1. Think about high level specification of interface (I.e what it needs to be accomplished)
            2. Simulated Control panel of oscilloscope ?
                a. Live feed of image
                b. Marker for error correction
                c. Control system (back-end)
                d. Previous robot chooses live view + buttons
                e. Good intergration of software and hardware
            3. Running PowerPoint
    b. Conceptual drawing of gribbers
    c. Good requirement:
        i. Push
        ii. Rotating bottom
        iii. slider

Date: 03/02
PPL: Jaelyn, David

Notes:
Progress:

1. Jaelyn: In the process of taking pictures of oscilloscopes, labeling underway, learning how to build a user interface based on the control panel.
   David: Currently still going through literature research, compiling different genre of approach. Purchasing of tools underway

Discussion points:

1. Final work : a 2D cartesian robot being able to be controlled via a working UI; two more small extras for CV (maximum expectation): pose & distance measurements; object recognition;
2. Design Criteria for Mechanical design: how do we optimize to one/ a few design.
3. The sequence of three checkpoints (CV). Current plan (UI, distance & pose measurements, object recognition)

To Do:

1. Summarize Literature research found
2. Preliminary CAD
3. Evaluation Chart (ideas)
4. Purchase List (Draft)
5. Progress in writing the user interface
6. Summarize literature research (UI)

Date: 02/18

PPL: Jaelyn, David, Dr.Krieger, Dr. Vagvolgyi

Notes:

Include touch screen is ideal

Video vs Image

- Start with image file (different angles, distance)
- Sample from video later (add to code later)

For now:
recognize device itself, currently only handle devices that are supported
1. Recognize device
2. Get pose of device
3. Use existing configuration to locate buttons and knobs

Goals:
only adjust knobs that we know what they do.
remote user interface is for individual devices (focus on larger scale)

1. Step : (Object registration to known coordinates)
    a. Identify device from distance (object segmentation/identification)
        i. Feature match ?
        ii. Key : maaannnny POV, with some occlusion.
    b. Bypass bypass (moving part)
    c. Nearby position adjustment (feature identification)
        i. Image processing + NN
        ii. Or pose estimation (Pose: Orientation + Position 6DoF Rigid Transform)

Mechanicsm:
modeling after a successful / commercialized grippers, already existing grabbing. (Study existing designs)
utilize literature.